

## REMARKS

Claims 1-32 were examined and reported in the Office Action. Claims 1-32 are rejected. Claims 1-2 are cancelled. Claims 3, 4, 19, 26 and 32 are amended. Claims 3-32 remain.

Applicant requests reconsideration of the application in view of the following remarks.

### I. 35 U.S.C. §112, first paragraph

It is asserted in the Office Action that claims 1 -31 are rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. Applicant respectfully traverses the aforementioned rejection for the following reasons.

Applicant's original specification asserts that boron and cobalt are listed as elements that are selectable with the copper foil (page 2, line 22 to page 3, line 2). In the selectable list are the elements of boron and cobalt. An alloy is a combination of two or more metals. Applicant asserts on page 3 of the original specification that the amount of boron is 0.0005 to 5.0 wt% of the copper and the amount of cobalt is 0.01 to 0.5 wt% of the copper. Applicant has amended claims 3, 4, 19, 26 and 32 with the aforementioned limitations. Therefore, the limitations in claims 3, 4, 19, 26 and 32 are supported in the original specification.

Accordingly, withdrawal of the 35 U.S.C. §112, first paragraph rejections for claims 1-31 are respectfully requested.

## II. 35 U.S.C. §102

It is asserted in the Office Action that claim 32 is rejected under 35 U.S.C. §102(b) as being anticipated by Ohashi et al. (WO 97/32347) ("Ohashi"). Applicant respectfully traverses the aforementioned rejection for the following reasons.

According to MPEP §2131, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.' (Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)). 'The identical invention must be shown in as complete detail as is contained in the ... claim.' (Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)). The elements must be arranged as required by the claim, but this is not an ipsissimis verbis test, i.e., identity of terminology is not required. (In re Bond, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990))."

Applicant's claim 32 contains the limitations of "[a] lithium secondary battery comprising: a positive electrode formed by coating lithium metal oxides on a positive current controller; a negative electrode formed by coating carbonaceous materials or SnO<sub>2</sub> on a negative current collector; the negative current collector being formed of a copper-based alloy foil with a thickness of 20  $\mu$ m or less and the copper-based alloy including at least one material selected from the group consisting of magnesium, boron, cobalt, vanadium, niobium, bismuth, and misch metal and further comprises a copper-based material selected from the group consisting of copper, copper/nickel, copper/titanium, and copper/nickel/titanium, wherein the copper-based alloy is produced by a plating process into a foil shape; a separator interposed between the positive and negative electrodes; and an electrolyte into which the positive and negative electrodes and the separator are immersed,

wherein an amount of nickel is 0.8 to 4 wt% of copper, an amount of titanium is 0.2 to 4 wt% of copper, an amount of magnesium is 0.05 to 0.6 wt% of copper, an amount of tin is 0.1 to 2.0 wt% of copper, an amount of boron is 0.0005 to 5.0 wt% of copper, an amount of chromium is 0.0005 to 0.5 wt% of copper, an amount of

manganese is 0.1 to 1.0 wt% of copper, an amount of cobalt is 0.01 to 2.0 wt% of copper, an amount of vanadium is 0.0005 to 0.5 wt% of copper, an amount of zirconium is 0.0005 to 0.5 wt% of copper, an amount of niobium is 0.0005 to 0.5 wt% of copper, an amount of bismuth is 0.0005 to 0.5 wt% of copper, an amount of lead is 0.0005 to 0.5 wt% of copper, and an amount of silver is 0.0005 to 0.5 wt% of copper.”

Ohashi discloses electrodes consisting of an electrode activator and a metallic collector. The electrode's binder is made of fluoroplastic grafted with at least one acrylic polymer. Ohashi, however, does not teach, disclose or suggest a Cu based alloy “wherein an amount of nickel is 0.8 to 4 wt% of copper, an amount of titanium is 0.2 to 4 wt% of copper, an amount of magnesium is 0.05 to 0.6 wt% of copper, an amount of tin is 0.1 to 2.0 wt% of copper, an amount of boron is 0.0005 to 5.0 wt% of copper, an amount of chromium is 0.0005 to 0.5 wt% of copper, an amount of manganese is 0.1 to 1.0 wt% of copper, an amount of cobalt is 0.01 to 2.0 wt% of copper, an amount of vanadium is 0.0005 to 0.5 wt% of copper, an amount of zirconium is 0.0005 to 0.5 wt% of copper, an amount of niobium is 0.0005 to 0.5 wt% of copper, an amount of bismuth is 0.0005 to 0.5 wt% of copper, an amount of lead is 0.0005 to 0.5 wt% of copper, and an amount of silver is 0.0005 to 0.5 wt% of copper.” Further, Ohashi does not teach, disclose or suggest “the copper-based alloy is produced by a plating process into a foil shape.” It should be noted that the plating method for the alloy foil of Applicant's claimed invention's CU alloy foil improves strength over pure CU. Therefore, metal foil coated with a coating layer cannot enhance strength as much as an alloy foil even if both foils are prepared by using a plating method.

Therefore, since Ohashi does not disclose, teach or suggest all of Applicant's claim 32 limitations, Applicant respectfully asserts that a *prima facie* rejection under 35 U.S.C. § 102(b) has not been adequately set forth relative to Ohashi. Thus, Applicant's claim 32 is not anticipated by Ohashi.

Accordingly, withdrawal of the 35 U.S.C. §102(b) rejection for claim 32 is respectfully requested.

### III. 35 U.S.C. §103(a)

A. It is asserted in the Office Action that claims 1,4-6, 26, 27, 29, 31 and 32 are rejected under 35 U.S.C. §103(a) as being unpatentable over U. S. Patent No. 5,368,958 issued to Hirai et al. ("Hirai") in view of no other prior art. Applicant respectfully traverses the aforementioned rejection for the following reasons.

According to MPEP §2142 "[t]o establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." (*In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)). Further, according to MPEP §2143.03, "[t]o establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. (*In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974))." *"All words in a claim must be considered in judging the patentability of that claim against the prior art."* (*In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970), emphasis added.)

Applicant's claim 4 contains the limitations of "a positive electrode formed by coating a lithium metal oxide on a positive current collector; a negative electrode formed by coating at least one of carbonaceous materials and SnO<sub>2</sub> on a negative current collector, where the negative current collector is made of a copper-based alloy with a thickness of 20 μm or less and the copper-based alloy comprises at least one material selected from the group consisting of boron and cobalt, and also comprises at least two materials selected from the group consisting of nickel, titanium, magnesium, tin, zinc, chromium, manganese, silicon, iron, vanadium, aluminum, zirconium, niobium, phosphorous, bismuth, lead, silver, and misch metal, wherein the copper-based alloy is produced by a plating process into a foil shape; a separator interposed between the positive and negative electrodes; and an electrolyte into which the positive

and negative electrodes and the separator are immersed,

“wherein an amount of nickel is 0.8 to 4 wt% of copper, an amount of titanium is 0.2 to 4 wt% of copper, an amount of magnesium is 0.05 to 0.6 wt% of copper, an amount of tin is 0.1 to 2.0 wt% of copper, an amount of boron is 0.0005 to 5.0 wt% of copper, an amount of chromium is 0.0005 to 0.5 wt% of copper, an amount of manganese is 0.1 to 1.0 wt% of copper, an amount of cobalt is 0.01 to 2.0 wt% of copper, an amount of vanadium is 0.0005 to 0.5 wt% of copper, an amount of zirconium is 0.0005 to 0.5 wt% of copper, an amount of niobium is 0.0005 to 0.5 wt% of copper, an amount of bismuth is 0.0005 to 0.5 wt% of copper, an amount of lead is 0.0005 to 0.5 wt% of copper, and an amount of silver is 0.0005 to 0.5 wt% of copper.”

Applicant's claim 26 contains the limitations of “a positive electrode formed by coating a lithium metal oxide on a positive current collector; a negative electrode formed by coating at least one of carbonaceous materials and  $\text{SnO}_2$  on a negative current collector, where the negative current collector is made of a copper-based alloy foil with a thickness of 20  $\mu\text{m}$  or less, and the copper-based alloy foil includes at least one material selected from the group consisting of boron and cobalt, and also includes at least two materials selected from the group consisting of nickel, titanium, magnesium, manganese, and zinc; a separator interposed between the positive and negative electrodes; and an electrolyte into which the positive and negative electrodes and the separator are immersed,

“wherein an amount of nickel is 0.8 to 4 wt% of copper, an amount of titanium is 0.2 to 4 wt% of copper, an amount of magnesium is 0.05 to 0.6 wt% of copper, an amount of tin is 0.1 to 2.0 wt% of copper, an amount of boron is 0.0005 to 5.0 wt% of copper, an amount of chromium is 0.0005 to 0.5 wt% of copper, an amount of manganese is 0.1 to 1.0 wt% of copper, an amount of cobalt is 0.01 to 2.0 wt% of copper, an amount of vanadium is 0.0005 to 0.5 wt% of copper, an amount of zirconium is 0.0005 to 0.5 wt% of copper, an amount of niobium is 0.0005 to 0.5 wt% of copper, an amount of bismuth is 0.0005 to 0.5 wt% of copper, an amount of lead is 0.0005 to 0.5 wt% of copper, and an amount of silver is 0.0005 to 0.5 wt% of copper.”

Applicant's claim 32 contains the limitations of "[a] lithium secondary battery comprising: a positive electrode formed by coating lithium metal oxides on a positive current collector; a negative electrode formed by coating carbonaceous materials or SnO<sub>2</sub> on a negative current collector; the negative current collector being formed of a copper-based alloy foil with a thickness of 20  $\mu$ m or less and the copper-based alloy including at least one material selected from the group consisting of magnesium, boron, cobalt, vanadium, niobium, bismuth, and misch metal and further comprises a copper-based material selected from the group consisting of copper, copper/nickel, copper/titanium, and copper/nickel/titanium, wherein the copper-based alloy is produced by a plating process into a foil shape; a separator interposed between the positive and negative electrodes; and an electrolyte into which the positive and negative electrodes and the separator are immersed,

"wherein an amount of nickel is 0.8 to 4 wt% of copper, an amount of titanium is 0.2 to 4 wt% of copper, an amount of magnesium is 0.05 to 0.6 wt% of copper, an amount of tin is 0.1 to 2.0 wt% of copper, an amount of boron is 0.0005 to 5.0 wt% of copper, an amount of chromium is 0.0005 to 0.5 wt% of copper, an amount of manganese is 0.1 to 1.0 wt% of copper, an amount of cobalt is 0.01 to 2.0 wt% of copper, an amount of vanadium is 0.0005 to 0.5 wt% of copper, an amount of zirconium is 0.0005 to 0.5 wt% of copper, an amount of niobium is 0.0005 to 0.5 wt% of copper, an amount of bismuth is 0.0005 to 0.5 wt% of copper, an amount of lead is 0.0005 to 0.5 wt% of copper, and an amount of silver is 0.0005 to 0.5 wt% of copper."

Hirai discloses a lithium anode having a sandwich structure. The structure disclosed has a lithium sheet, conductive foil and a lithium sheet. The conductive foil disclosed by Hirai is made of Copper. Hirai, however, does not teach, disclose or suggest a Cu based alloy "wherein an amount of nickel is 0.8 to 4 wt% of copper, an amount of titanium is 0.2 to 4 wt% of copper, an amount of magnesium is 0.05 to 0.6 wt% of copper, an amount of tin is 0.1 to 2.0 wt% of copper, an amount of boron is 0.0005 to 5.0 wt% of copper, an amount of chromium is 0.0005 to 0.5 wt% of copper, an amount of manganese is 0.1 to 1.0 wt% of copper, an amount of cobalt is 0.01 to 2.0 wt% of copper, an amount of vanadium is 0.0005 to 0.5 wt% of copper, an amount of zirconium is 0.0005 to 0.5 wt% of copper, an amount of niobium is 0.0005 to 0.5 wt% of

copper, an amount of bismuth is 0.0005 to 0.5 wt% of copper, an amount of lead is 0.0005 to 0.5 wt% of copper, and an amount of silver is 0.0005 to 0.5 wt% of copper.”

Hirai does not teach, disclose or suggest the limitations contained in Applicant's claims 4, 26 and 32 as listed above. Since Hirai does not teach, disclose or suggest all the limitations of Applicant's claims 4, 26 and 32, as listed above, there would not be any motivation to arrive at Applicant's claimed invention. Thus, Applicant's claims 4, 26 and 32 are not obvious over Hirai in view of no other prior art since a *prima facie* case of obviousness has not been met under MPEP §2142. Additionally, the claims that directly or indirectly depend from claims 4 and 26, namely claims 5-6, 27, 29 and 31, respectively, would also not be obvious over Hirai in view of no other prior art for the same reason.

Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejections for Claims 1, 4-6, 26-27, 29 and 31-32 are respectfully requested.

**B.** It is asserted in the Office Action that claims 1-6, 19-21, 26, 27 and 29-31 are rejected under 35 U.S.C. §103(a) as being unpatentable over Takagi in view of no other prior art. Applicant respectfully traverses the aforementioned rejection for the following reasons.

Applicant asserts that Applicant's claimed invention benefits from the acknowledged priority date of January 25, 1999, which predates Takagi (March 30, 1999). Note that Applicant's other priority document asserts lead and silver, which were not asserted in the earlier priority date. Applicant has amended claim 32 to remove the limitation of “silver,” and it is noted that “lead” is not asserted in the claim. Therefore, Applicant asserts that Takagi is not a valid reference under 35 U.S.C. §102(a).

Moreover, Applicant's claims 3, 4, 19 and 26 contain the limitations of “wherein an amount of nickel is 0.8 to 4 wt% of copper, an amount of titanium is 0.2 to 4 wt% of copper, an amount of magnesium is 0.05 to 0.6 wt% of copper, an amount of tin is 0.1 to 2.0 wt% of copper, an amount of boron is 0.0005 to 5.0 wt% of copper, an amount of chromium is 0.0005 to 0.5 wt% of copper, an amount of manganese is 0.1 to 1.0 wt% of copper, an amount of cobalt is 0.01 to 2.0 wt% of copper, an amount of vanadium is

0.0005 to 0.5 wt% of copper, an amount of zirconium is 0.0005 to 0.5 wt% of copper, an amount of niobium is 0.0005 to 0.5 wt% of copper, an amount of bismuth is 0.0005 to 0.5 wt% of copper, an amount of lead is 0.0005 to 0.5 wt% of copper, and an amount of silver is 0.0005 to 0.5 wt% of copper.”

Even if Takagi was valid prior art, Takagi discloses a copper foil-made current collector for a secondary battery. The copper foil-made current collecting body is 99.90 wt % of copper with the rest of the wt% being from impurities. Therefore, Takagi does not teach, disclose or suggest a Cu based alloy “wherein an amount of nickel is 0.8 to 4 wt% of copper, an amount of titanium is 0.2 to 4 wt% of copper, an amount of magnesium is 0.05 to 0.6 wt% of copper, an amount of tin is 0.1 to 2.0 wt% of copper, an amount of boron is 0.0005 to 5.0 wt% of copper, an amount of chromium is 0.0005 to 0.5 wt% of copper, an amount of manganese is 0.1 to 1.0 wt% of copper, an amount of cobalt is 0.01 to 2.0 wt% of copper, an amount of vanadium is 0.0005 to 0.5 wt% of copper, an amount of zirconium is 0.0005 to 0.5 wt% of copper, an amount of niobium is 0.0005 to 0.5 wt% of copper, an amount of bismuth is 0.0005 to 0.5 wt% of copper, an amount of lead is 0.0005 to 0.5 wt% of copper, and an amount of silver is 0.0005 to 0.5 wt% of copper.”

Therefore if Takagi is valid prior art, Takagi does not teach, disclose or suggest the limitations contained in Applicant's claims 3, 4, 19 and 26 as listed above. Since Takagi does not teach, disclose or suggest all the limitations of Applicant's claims 3, 4, 19 and 26, there would not be any motivation to arrive at Applicant's claimed invention. Thus, Applicant's claims 3, 4, 19 and 26 are not obvious over Takagi in view of no other prior art since a *prima facie* case of obviousness has not been met under MPEP §2142. Additionally, the claims that directly or indirectly depend from claims 4, 19 and 26, namely claims 5-6, 20-21, and 27 and 29-31, respectively, would also not be obvious over Takagi in view of no other prior art for the same reason.

Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejections for Claims 1-6, 19-21, 26-27 and 29-31 are respectfully requested.



**CONCLUSION**

In view of the foregoing, it is believed that all claims now pending, namely 3-32, patentably define the subject invention over the prior art of record and are in condition for allowance and such action is earnestly solicited at the earliest possible date.

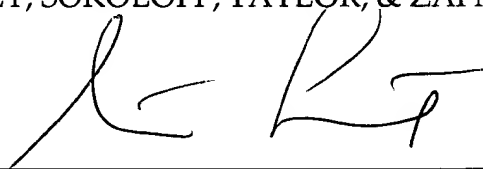
If necessary, the Commissioner is hereby authorized in this, concurrent and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2666 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17, particularly extension of time fees.

**PETITION FOR EXTENSION OF TIME**

Per 37 C.F.R. 1.136(a) and in connection with the Advisory Action mailed on August 18, 2004, Applicant respectfully petitions the Commissioner for a three (3) month extension of time, extending the period for response to October 14, 2004. The Commissioner is hereby authorized to charge payment to Deposit Account No. 02-2666 in the amount of \$980.00 to cover the petition filing fee for a 37 C.F.R. 1.17(a)(3) large entity. A duplicate copy of this sheet is enclosed.

Respectfully submitted,  
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Dated: October 13, 2004

By:   
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**CERTIFICATE OF MAILING**

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail with sufficient postage in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P. O. Box 1450, Alexandria, Virginia 22313-1450 on October 13, 2004.

  
Jean Svoboda